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ABSTRACT

A study was undertaken to determine the degree and nature of expectancy of reinforcement in high school underachievers, and to evaluate a method for modifying the internal versus external expectancies which relate to motivation for achievement and attainment of success. A computer instructional program was used to impart immediate reinforcement for subject's responses, to show that his behavior, over which he has direct control, determines his success or failure. Underachievers were identified, and 16 were randomly assigned to a tutorial group, 16 to a study skill group, and 17 to the computer group for an eight-week period. It was found that sex and class level are important in determining the external expectancy tendency of underachievers. All three experimental approaches resulted in increased internality, without significant differences among the groups. Also, none of the approaches resulted in a significant change in grades earned by the underachievers. Rotter's internal-external (I-E) scale is included. (KW)

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AN EVALUATION OF A NEW APPROACH IN DEALING WITH HIGH SCHOOL UNDERACHIEVEMENT

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September 30, 1969

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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(a) Materials used for Study Improvement Course

(b) Rotter's I-E Scale

(c) Reprint of article by Tolor on "Incidence of Underachievement at the High School Level"

Summary

A number of approaches used in the past to improve the underachiever's performance have had uncertain success. The present study attempted to employ a different method to the problem of the underachiever by focusing on a personality variable, the internal versus external expectancy of reinforcement, which relates to motivation for achievement and the attainment of success.

The study undertook to determine the degree of external expectancy in high school underachievers, and to investigate the efficacy of a method for modifying the internal-external attitude and thereby the grades earned by underachieving students. The method proposed was the introduction of a computer instructional program, not to teach subject matter per se, but to impart immediate reinforcement for the subject's own responses so that he can learn that his own behavior is instrumental in the attainment of success or failure.

It was hypothesized first that underachievers tend to perceive their successes and failures as being caused by factors outside their control more so than normal high school achievers, and, second, that underachievers will demonstrate academic improvement if they learn to expect that their successes and failures are due to their own behavior rather than external factors.

The method involved first the identification of operationally defined high school underachievers and their comparison with normal achievers on Rotter's internal-external (I-E) scale. Underachievers were defined as students who have at least average intelligence on a group test of intelligence and who fall at least one standard error of estimate below expectancy on the composite score of the National Educational Development Test, which is an achievement test. There were 179 underachievers and 512 normal achievers in the basic sample. The underachievers and normal achievers did not differ in age or intelligence, but there was a greater representation of males among junior-year underachievers.

For the second part of the procedure, high school underachievers who also scored high in externality (12 or above) were selected for random assignment to one of three treatment groups: (a) the tutorial group, (b) the study skill improvement group, or (c) the computer group. The 17 children in the tutorial group received individualized help in the areas of their special deficiencies; the 16

children in the study skill group received individualized instruction in study habit improvement; and the 17 children in the computer group were exposed to an environment where each individual had direct control over his successes or failures and received immediate reinforcement for each response. The specific interventive procedure, for each group, consisted of exactly two 45-minute sessions each week for eight weeks. The eight-week period referred to the same time in the school year for all Ss. The pre-experimental I-E scores, initial achievement test performance, class standing, intelligence, and grades were comparable for the three experimental groups except for the initial grades which were significantly higher for the computer group as compared to the study skills group.

It was found that underachievers show a near significant tendency to be more external in their expectancy than normal achievers, but only at the senior-year level. Therefore, the first hypothesis received partial confirmation. However, at the junior-year level, underachieving girls were significantly more internal than normally achieving girls. There was also a significant change toward more externality for girls between the junior and the senior year level. Female seniors, as a total group, were also more external than male seniors, irrespective of their achievement status. These findings underscore the importance of taking into account the sex and class level of the sample.

In regard to that part of the study which dealt with the effects of the interventive procedures, both the tutorial and the study skill approach resulted in significantly increased internality. The subjects in the computer group also became more internal in expectancy, but the difference just failed to attain significance.

It was also found that none of the experimental approaches employed resulted in a significant change in grades. Moreover, when all subjects who became more internal were compared with those who became more external, there was only a non-significant trend for internals to show improved grades and externals to exhibit a deterioration of grades. A series of analyses of covariance indicated that there were no significant group differences on the dependent variables of change in I-E or change in grades when intial intelligence, initial grades, and initial achievement were held constant.

These findings indicate that for seniors the attitude that successes or failures are contingent upon factors over which one has no control is typical for the underachiever whereas the normally achieving senior feels he, himself, is responsible for his successes or failures. It is quite possible that this locus of control attitude becomes develop-

mentally crystallized as a function of academic performance only at a time when college and work possibilities become vital issues for the student. It appears also that boys, unlike girls, intensify their effort to achieve during the senior year so that they also demonstrate less external expectancy of control at that level.

The results also suggest that an educational approach which emphasizes a personalized relationship in which attitudinal and cognitive factors are emphasized is more helpful in promoting the desired internal expectancy than a less personalized approach.

None of the brief procedures which are intended to improve academic performance had an immediate discernible effect on grades, and educators should not expect such results from short-term methods. Perhaps more important than any hoped for changes in grades is the need to develop and improve methods that reduce a feeling of frustration, despair and disengagement from challenges in life. Methods that enhance the expectancy of internal control of reinforcement are precisely the ones that are needed for this vital purpose.

Introduction

Despite an adequate or even above average intellectual capacity, unimpaired motor ability, intact sensory functioning, and absence of major emotional disturbance, a large number of children fails to achieve satisfactorily in their academic work. These children, with essentially unimpaired intellectual, motor, and sensory functions, have been assigned such descriptive labels as "underachievers" and "children with psychoneurological learning disabilities" in order to convey their major difficulty, namely, that of poor academic performance in the absence of any discernible defect in the structural apparatus required for the learning process to occur.

While there is much evidence available to support the proposition that school achievement is related to social class in a general sense, especially in large urban centers and with minority groups, the social factor is not necessarily the major variable accounting for level of school performance (Goldstein, 1967). Thus, there are many children of low-income families who achieve satisfactorily just as there are many children of high-income parents who fail to achieve satisfactorily in their academic performance. Since underachievement apparently cuts across the social class variable, other aspects of the problem need to be investigated.

A variety of approaches has been employed in an attempt to enhance the status of the underachiever. Among these efforts have been programs designed to improve study habits, remedial tutorial programs, and psychotherapy undertakings. Although these efforts have in some instances resulted in some degree of improvement, in general the results remain equivocal and uncertain.

The present study is designed to assess the efficacy of a different approach to the problem. This approach employs a method which has recently become technologically feasible to modify a specific personality variable that theoretically relates to motivation for achievement and the attainment of success. The personality dimension under consideration is the generalized expectancy or belief in internal or external control of reinforcement, i.e., the degree to which an individual expects that reward or reinforcement will be contingent on his own behavior or will follow upon forces which are independent of his own actions. Rotter (1966) demonstrated that consistent individual differences exist in this variable, and that the generalized expectancy for internal or external control of reinforcement bears some relationship to other personality dimensions, such as motivation in achievement situations.

In applying the concept of locus of control to the problem of underachievement, it is hypothesized that:

(a) Underachievers, in general, tend to perceive their successes and failures as being based on forces or factors that are outside their own control. In other words, underachievers will tend to be more external than normal achievers.

(b) Underachievers will improve in their academic performance if they can learn to expect their successes and failures are contingent upon their own behavior. In other words, underachievers who become more internal in expectancy will show greater academic improvement than underachievers who do not become more internal in their expectancy.

The change from high externality to a lesser degree of externality is to be accomplished by means of underachieving students participating in a computer instructional program that enables them to gain immediate positive or negative reinforcement for responses made by them. Thus, the computer system is selected since it is regarded as a technologically advanced method for effecting a change in expectancy within a relatively short period of time. It should be noted that the intent is not to employ the computer in the more customary manner as an instructional aide in the mastery of subject matter per se, but the intent is to

employ the computer to assist in the modification of one specific attitudinal disposition. As a matter of fact, the specific program utilized to effect the change toward increased internal expectancy does not contain in its content anything that even remotely resembles the subject matter in which the children exhibit deficiencies.

Method

First Phase

The first phase of this study consisted of a comparison of a group of high school students described as underachievers with a group of high school students characterized as normal achievers on the I-E scale measuring subjects' generalized expectancy about how reinforcement is controlled, i.e., whether by internal or external means. Not only were there no clear data available on the incidence of underachievement at the high school level prior to this study, but also no common acceptable standards of measurement of underachievement have emerged (Gowan, 1964). The problem of the incidence of underachievement and the criteria for identification of underachievement are, of course, closely related issues calling for the adoption of an operational definition of underachievement. For the purpose of the present study an "underachiever" was operationally defined as a student who is at least average in current intellectual functioning on the Otis Quick Scoring Test and one who falls at least one standard error of estimate below expectancy on the composite score of the National Educational Development Test, based on his intellectual status. The normal achiever was defined as a child who has at least average current intellectual functioning and one who does not differ by one standard error of estimate on the achievement test.

It is recognized that this operational definition of underachievement represents only one of many approaches and that the many techniques for determining lack of academic achievement yield results that are not always highly correlated with one another (see, e.g., Farquhar & Payne, 1964; Peterson, 1963). However, the method employed in the present study, which consists of the assessment of the discrepancy between intellectual ability and achievement test performance, is a model that has been recommended by other investigators (e.g., Clark & Tiegs, 1963).

Regression equations between intelligence and achievement, and standard errors of estimate to establish limits, had been established with another group of senior-year students

during the previous year at the same high school in which the current study was undertaken (see Tolor, in press). It should be noted that the National Educational Development Tests (Science Research Associates, 1965) are routinely administered to all students at the 10th grade level of the school where this research was done. The NEDT provides scores in different instructional areas, namely, English usage, mathematical usage, social studies reading, natural science reading, and word usage, and also yields a composite score which represents an index of overall education development. The Otis Quick Scoring Test is also administered routinely in the 10th grade to all students at this high school.

Employing the operational definition of underachievement described above, it was found that at the junior and senior high school level there were 179 underachievers identified by means of these criteria. By comparison, there were 512 juniors and seniors who could be categorized as normal achievers.

In order to determine whether the underachievers and the normal achievers differed on any of the salient population characteristics, these two groups were compared in regard to sex, age, and intelligence. The comparisons for age and intelligence are presented in Tables 1 and 2. As can be seen from these Tables, the underachievers and normally achieving youth did not differ significantly on the variables of age or intelligence, but they did exhibit significant differences in sex composition. More specifically, it was found that there was an over-representation of males among the underachievers at the junior-year level (chi-square=9.49, $p<.01$), but this difference did not apply to the senior-year level (chi-square=1.38, $p<.30$). At the junior level it was found that of the 82 underachievers, 52 were male as compared with 30 females. By contrast, of the 290 normal achievers at the junior-year level, 162 were female while 128 were males. The breakdown at the senior level, where no significant sex differences were found, was 42 male and 55 female underachievers as compared with 112 male and 110 female normal achievers.

Table 1

Comparison of IQ Scores Obtained on the Otis Quick Scoring Test by Underachievers and Normally Achieving Students

Class	Underachievers		Normal Achievers		t
	Intelligence		Intelligence		
	M	SD	M	SD	
Junior (N=372)	110.29	9.94	111.97	10.55	1.39
Senior (N=319)	112.00	7.84	111.38	10.75	.58
Total (N=691)	111.22	8.60	111.72	10.58	.63

Table 2

Comparison of Ages of Underachievers and Normally Achieving Students

Class	Underachievers		Normal Achievers		t
	Ages		Ages		
	M	SD	M	SD	
Juniors (N=372)	16.38	.37	16.42	.45	.82
Seniors (N=319)	17.30	.36	17.38	.37	1.80
Total (N=691)	16.88	.55	16.84	.52	.83

Following the identification of underachievers and normally achieving Ss, and after it was determined that these two subsamples did not differ in intelligence or age,

all of the 691 students were administered the I-E scale in small groups. Rotter's (1966) I-E scale, measuring S's generalized expectancy of how reinforcement is controlled, i.e., whether by internal or external means, is a 29-item forced choice test which is scored by totaling the number of external choices so that a high score indicates an expectancy that rewards will follow from forces that are outside of one's self and a low score indicates that the S believes rewards are contingent on his own behavior or characteristics. Rotter (1966) cites several studies in support of this scale's discriminant and construct validity. Test-retest correlations of .60 and .78 are reported with a one-month interval.

Second Phase

The major part of the study was not contingent upon the outcome of the first hypothesis. The second phase of the study focused exclusively upon underachievers who also were identified as high in the external expectancy of control. It was assumed that even among underachievers, since underachievement is a symptomatic end result having a variety of causes, there is a great amount of variance on the internal-external dimension. The purpose of this phase of the study was not so much to elucidate the entire complex, multi-faceted problem of underachievement, but to test the efficacy of one innovative approach as applied to one specific kind of underachiever, namely, the underachiever who also is high in external attitude. Accordingly, the method called for the use of an interventive procedure which would be likely to produce a reduction in the external expectancy of control. Two other remedial methods were also included in the design in order to make possible a comparison of the effectiveness of commonly employed methods of dealing with underachievement with the novel approach based on a different conceptualization of the problem, i.e., that some types of underachievement are a function of a specific expectancy of control which interferes with efficient learning. It was anticipated that the more traditional remedial methods, one a tutorial approach, and the second, an approach dealing with the improvement of study habits, would result in less academic improvement than the method which was specifically designed to reduce S's externality.

The second stage of this study, therefore, applied only to high school students who are both high in externality and who were also underachievers. The students who fit these criteria were randomly assigned to one of the three treatment procedures following the granting of permission by parents for their participation in the study.

Although 76 students qualified for inclusion under the provision that they: (a) Scored 12 or above on the I-E scale, (b) had an IQ of at least 90, and (c) had a composite score on the NEDT of at least one standard error of estimate below expectancy for their intelligence, permission was granted by only 50 students or their parents. Incidentally, the score of 12 or above was selected because in a large national stratified sample of 1,000 male and female youth in the 10th, 11th, and 12th grades it had been found that the mean I-E score for this population was 8.50, with a standard deviation of [redacted] 3.74 (Franklin, 1963). Thus, the score of 12 represents approximately a one standard deviation cut-off point.

These 50 students comprised the subjects of the three experimental groups, namely, the tutorial group (N=17), the study skills group (N=16), and the computer group (N=17). The members of the tutorial group were exposed to two 45-minute sessions each week for eight academic weeks with each student receiving help in the areas of his special deficiencies as determined by his NEDT performance. Two tutors, one male and one female, worked closely with the youth in this group, with each tutor offering help in the areas of his or her special competence.

The members of the study skills group received an equivalent amount of time over the same period in the school year in instruction regarding the improvement of study habits and approaches with an aim toward helping each student to study more efficiently. The teacher followed the guidelines presented in several references, including the book, "How to Study" (Preston & Botel, 1956). This publication covers such topics as the planning of time for studying, mastery techniques, and note-taking. (The complete list of references used is listed in the Appendix.) One female teacher devoted her time to this effort.

The computer instructional group was taught a conversational programming language (APL) by means of an IBM 1500 computer system. Each student appeared at the University's computer center for twice-weekly 45-minute sessions for eight weeks to learn the course, "Introduction to APL". The specific training for the computer group consisted of learning that events were contingent upon the subject's own responses, i.e., reinforcement is a function of the S's instrumental behavior. For the computer group an environment was created for the subjects where each individual had direct control over his successes and failures and where he is given

immediate information about his successes or failures. Every student response, whether correct or not, was immediately reinforced positively or negatively. Correct responses resulted in such feedback printouts as "Right! Now go on to the next item", and incorrect responses produced such printout messages as "Not right! Please try again". The level of difficulty of the material was compatible with the ability of the high school student of average intelligence. It was assumed, based on the child's general repertoire of previous experience within this culture that these verbal reinforcers would serve as appropriate secondary reinforcers.

Although membership in each of the three experimental groups was randomly determined, it remained to be established that the three groups did not differ markedly on any of the relevant variables prior to the initiation of the interventive programs. Accordingly, the three groups were compared for initial I-E scores, achievement test scores, sex, age, academic class status (i.e., junior or senior level), intelligence, and grades. Table 3 indicates that the three groups had been well-equated for initial I-E scores, achievement scores, sex, age, class status, and intelligence. On none of these variables do the groups differ significantly, when appropriate *t*-tests or χ^2 analyses are performed.

Table 3

Comparison of Three Experimental Groups on the Variables of Sex, Age Class Status, Intelligence, Pre-Treatment Internal-External Expectancy and Achievement Test Scores

Group	Variable											
	Sex		Age		IQ		Class		I-E (Initial)		NEDT Achievement Composite	
	M (%)	F (%)	M	SD	M	SD	Jr.	Sr.	M	SD	M	SD
Computer (N=17)	47	53	17.01	.71	113.29	8.35	6	11	14.18	1.55	15.24	2.75
Tutorial (N=17)	53	47	16.89	.63	114.41	8.68	6	11	14.53	1.53	15.65	2.45
Study Skills (N=16)	69	31	17.00	.66	111.75	9.35	7	9	14.19	1.79	14.75	3.62

Before presenting the results of the between-groups comparability for initial grades, some explanations are in order. Since grades earned in English, mathematics, social studies, and science represented one of the dependent variables, teachers had been requested to submit grades on examinations and quizzes taken for each of the project Ss for an eight-week period (December 9, 1968 through February 14, 1969) prior to the experimental interventions. In the computation of average grades, examination grades were given twice the weight of quiz grades but the midterm examination grade was assigned the same weight as the other examinations. Letter grades were transformed into numerical scores of 96, 86, 77, 69, and 50 for A, B, C, D, and F marks, respectively, in conformity with the school's standards. Plus or minus designations following the letter grades were disregarded.

As can be seen from Table 4, of the three group comparisons in grades prior to treatment, only one attains significance. The mean grade for the students who were later exposed to the computer approach was significantly (t=2.61, $p<.05$) higher (M=76.13) than the mean grade of the students who were later exposed to the study skills improvement program (M=67.63). However, the tutorial group did not differ from the computer group nor did the tutorial group differ from the study skills improvement group.

Table 4

Comparison of the Three Experimental Groups in Pre-Treatment Academic Grades

Group	Grades		t-tests	
	Mean	SD	vs. Tutorial	vs. Study Skills
Computer (N=16)[a]	76.13	8.61	1.95	2.69*
Tutorial (N=17)	70.59	7.61		1.00
Study Skills (N=16)	67.63	9.24		

[a]Note - One of the computer Ss dropped out from the study before the initiation of the experimental procedures.

*$p<.05$

Despite the one significant between-groups difference in initial grades, the three experimental groups were indeed quite comparable on all relevant variables justifying their use for comparison of the effects of the interventive procedures on subsequent academic performance.

Results

First Phase: Relationship Between Underachievement and Externality

As can be seen from Table 5, the hypothesized relationship between underachievement and externality approached significance at the senior-year level only (p was just beyond the .05 level using a one-tailed test). In other words, it was found that senior high school underachievers tended to attribute the occurrence or outcome of events predominantly to chance, luck, or other factors which are outside their control, while senior high school normal achievers tended to attribute greater importance to their own behavior, skills, or other aspects of the internal locus of control dimension. This relationship was not found to hold for juniors or for the combined sample of seniors and juniors.

Table 5

A Comparison of Underachievers and Normally Achieving High School Students in Their Expectancy of Internal-External Control as Measured by the I-E Scale

Class	Underachievers		Normal Achievers		t
	I-E		I-E		
	M	SD	M	SD	
Juniors (N=372)	10.11	3.90	10.29	4.20	.36
Seniors (N=319)	11.07	3.75	10.41	4.06	1.43*
Total (N=691)	10.63	3.85	10.34	4.15	.85

*p just beyond .05 with one-tailed test.

Further analyses indicated that sex differences interacted significantly with grade level in producing changes in internal-external attitude. These differences, however, applied only to females. More specifically, at the junior level, girls who are underachievers (N=30) tended to be significantly (t=2.45, $p<.05$) more internal (M=8.87, SD=3.36) than girls (N=162) who are normal achievers (M=10.56, SD=4.04). However, there is a significant (t=3.69, $p<.01$) change for underachieving girls between the junior and the senior years in the direction of increased externality. Thus, underachieving girls receive a mean I-E score of 8.87 (SD=3.36) at the junior year level and a mean score of 11.75 (SD=3.60) at the senior level. No comparable changes are observed for the boys between the junior and the senior years.

Some of these sex differences are confirmed by the further finding that female seniors, as a total group, tend to be significantly (t=2.45, $p<.02$) more external (M=11.13, SD=3.97) than senior males (M=10.05, SD=3.92). Also, there is a small, but significant ($p<.02$), negative point-biserial correlation of -.14 between sex and I-E score at the senior level. The latter finding indicates that at the senior level there is some degree of association between internality and male status.

To summarize, based upon the initial identification of achievers and underachievers and the results of the first stage of the study:

1. Normal achievers and underachievers do not differ in age or intelligence, but there is a significantly greater number of boys who underachieve at the junior level as compared to girls.
2. In accord with the hypothesis, there is a near significant tendency for underachievers to be more external in their expectancy than normal achievers at the senior-year level. This confirmation does not, however, apply to the juniors.
3. At the junior level, underachieving girls are significantly more internal as compared to normally achieving girls.
4. Underachieving girls become significantly more external as they progress from the junior to the senior year of high school. There is no comparable change for boys.
5 Female seniors, as a total group, are significantly more external than senior males.

Second Phase: Post-treatment Results

Turning now to the findings pertaining to the performance of the students following the eight-week period (February 17, 1969 through April 18, 1969) of specialized programming, we first examined the effect of the procedures on the internal-external control dimension. As can be seen from Table 6, using the "Student" t-test for small correlated samples, there were significant modifications in the direction of increased internality for the tutorial and study skills groups, but not for the computer group, although the latter just barely missed the .05 level of significance with a one-tailed test. There is evidence, therefore, that a personalized relationship in which cognitive and attitudinal factors are emphasized has a highly positive effect in producing a change from the generalized expectancy that experiences of success or failure are contingent upon factors external to the self to the generalized expectancy that successes or failures follow upon factors over which one has personal control. The more impersonal computer approach, which was specifically designed to effect this type of change, however, was far less successful in achieving this desired result than the other two procedures although the change with the computer group is also in the hypothesized direction.

Table 6

Treatment Changes in Internal-External Expectancy for Three Experimental Groups

Group	I-E Scores				t	p[a]
	Treatment					
	Pre		Post			
	M	SD	M	SD		
Computer (N=16)	14.56	1.60	13.13	3.77	1.74	NS
Tutorial (N=17)	14.18	1.55	12.24	2.88	2.49	<.025
Study Skills (N=15)[b]	14.07	1.78	12.60	2.63	2.13	<.05

[a]One-tailed tests

[b]The N was reduced by one because of the loss of a student in this group.

The second post-treatment analysis addressed itself to the question of changes in grades earned following the program interventions. The period of time during which grades were recorded extended from April 28 to June 9 for seniors (6 weeks) and from April 28 through June 23 for juniors (8 weeks). (The difference in post-treatment grade periods was caused by the fact that seniors completed the final marking period earlier than the juniors.) In the computation of average post-treatment grades, final examination grades were assigned twice the weight of the other examination grades which in turn were given double the weight of grades on quizzes, including laboratory evaluations. Table 7 reveals the lack of any systematic or significant changes in grades earned for any of the three groups. Therefore, it appears that none of the experimental procedures resulted in academic improvement.

Table 7

Treatment Changes in Grades for Three Experimental Groups[a]

Group	Grades				t	p
	Treatment					
	Pre		Post			
	M	SD	M	SD		
Computer (N=16)	76.13	8.61	74.69	8.14	1.13	NS
Tutorial (N=17)	70.59	7.62	72.47	7.74	1.38	NS
Study Skills (N=15)	68.67	8.60	68.00	9.99	.49	NS

[a]Note - All data are based on only those Ss who were available for both pre- and post-treatment testing.

While it is clear that grades did not undergo any significant improvement for any of the three groups, it is still possible that those Ss who became more internal, irrespective of the specific interventive procedure employed, would be differentiated on the basis of grade changes from those who became more external. To test this possibility, the 30 students who achieved an increase in internality were compared with the 13 students who became more external.

The amount of I-E change was not taken into account in this analysis but only its directionality. The mean grade change for the Ss who became more internal was .03 (SD=5.10) as compared with a mean grade change of -2.0 (SD=5.66) for those who became more external. While the direction of the group difference in grade change is in accord with expectations, the difference is not sufficiently large (t=1.13) to attain significance.

In order to focus more directly on the relative group differences on the dependent variables, a series of analyses of covariance were performed. All together there were six analyses of covariance done: (1) change in I-E, holding IQ constant; (2) change in I-E, holding original achievement constant; (3) change in grades, holding IQ constant; (4) change in grades, holding original achievement constant; (5) change in I-E, holding change in grades constant; and (6) change in I-E, holding original grades constant. The data were analyzed, in each instance, for males and females separately and for both sexes combined. As can be seen from Table 8, none of the F values attains significance, indicating that the three treatment groups do not differ from one another on the dependent variables of internal-external expectancy of reinforcement or grades, when possible differences among groups in original grades, intelligence, and achievement are controlled.

Table 8

Summary of Analyses of Covariance

Analysis of Covariance	F[d] Males[a]	Females[b]	Total[c]
Change in I-E, holding IQ constant	.13	.50	.14
Change in I-E, holding original achievement constant	.13	.48	.12
Change in grades, holding IQ constant	1.98	.45	1.71
Change in grades, holding original achievement constant	2.05	.28	1.74
Change in I-E, holding change in grades constant	.30	.47	.05
Change in I-E, holding original grades constant	.28	.64	.20

[a] df=2/22

[b] df=2/18

[c] df=2/44

[d] All F are non-significant

Conclusions

This study attempted to explicate the relationship between perceived locus of control and underachievement in high school students, and to develop a method that might be useful in the alleviation of the problem of poor academic performance based on a conceptual analysis of underachievement in terms of non-cognitive factors.

The hypothesized relationship between externality and underachievement was only partially confirmed in that only senior class students demonstrated this relationship at a level which approaches signficance. Thus, for seniors, an attitude characterized by the attribution of successes and failures to factors over which one has no personal control was much more typical for the underachieving student than for the normally achieving student. This finding is related to those recently reported by Crandall and McGhee (1968). Crandall and McGhee reasoned that expectancy of reinforcement should be partially determined by past grades and should also constitute a motivational determinant of current academic behavior. These investigators found in five separate studies, with subjects ranging from junior high school to the college level, that academic competence was related to high levels of expectancy. Their work did not, however, deal directly with internal vs. external expectancy orientations.

The reasons that the relationship between external expectancy and underachievement did not generalize to the junior-year level are not entirely clear. It is possible that underachievement is not yet as vital a matter for high school juniors as it is for seniors who are confronted with the reality problem of encountering considerable difficulty in getting into colleges of their choice or in dealing with the world of work. What is suggested is that there may be much greater ego-involvement with experienced academic successes and failures during the senior year, when a boy or girl can perceive in very practical terms how his own performance relates to those of his peers, than at the junior level when the consequences of successes or failures seem more remote. Consequently, a much more highly crystallized development of the locus of control attitude might not occur until the senior year.

This explanation would be consistent with the finding that girls become significantly more external during their senior year. Moreover, it is underachieving girls

who actually had been more internal than normally achieving girls as juniors. The suggested emerging trend, therefore, is for girls who underachieved during their junior year and who perceived the cause-effect relationship of their inadequate performance quite realistically at that time become less inclined to accept responsibility for their poor performance during the senior year and therefore become more external. As for boys, although there is a greater percentage of boys than girls who underachieve at the junior level, the proportion of boys in relation to girls who underachieve at the senior level declines markedly (from 63% to 43%). This change would suggest that boys tend during their last year of high school to work harder so that their achievement becomes more compatible with their intellectual potential. Thus, they would have less need to seek recourse in adopting a defensive external expectancy of reinforcement during the senior year than do underachieving girls.

These tentative explanations require further testing, especially if one could rule out an alternative possibility that perhaps boys and girls experience differential drop-out rates between the junior and senior years.

The three interventive procedures designed to alleviate underachievement produced some very unexpected results. First of all, all interventive procedures led to the participants developing a more internal locus of control which is a highly desirable effect. However, the change was significant for the tutorial and study skills groups only, while barely falling outside the acceptable significance level for the computer group. Thus, the treatment approach which was designed to increase internality most efficiently was found to be a poor approach. However, when the change among groups is compared holding constant original intelligence, grades, or achievement, by means of analyses of covariance, no significant group differences are found.

Among the reasons that might be offered to account for the relative ineffectiveness of the computer approach in achieving greater change in favor of internality are the following: (1) There was insufficient exposure for the computer group Ss to the learning experience; (2) Some computer Ss experienced at times considerable frustration because the application of the program resulted in a number of technical difficulties that took time to be corrected; (3) Unlike the youth in the other two procedures, the computer participants were physically transported to a site removed from their school with unknown effects on internal-external expectancy of this change

in environments and the accompanying inconvenience experienced; and (4) the impersonal nature of the task might have mitigated against the development of a greater degree of internality.

To elaborate on the first point, the mean number of absences for the tutorial, how to study, and computer groups was .18 (SD=.51), .23 (SD=.50), and 2.13 (SD=.98), respectively. The differences between the number of absences for the tutorial as compared with the other two groups is highly significant (t=7.20 and t=6.79, both $p<.01$), and indicates less opportunity for the computer Ss to experience a comparable amount of exposure to the treatment procedure. Unfortunately, this disparity was unavoidable since the more individualized approach used in the non-computer groups made it possible to schedule make-up time for Ss who would otherwise have missed a session. This rearrangement of time was not, however, possible for the computer Ss since the computer was in use for other activities during the time when it had not been specifically assigned for project use.

The other explanation that seems to require further elaboration is the fourth pertaining to the more personal nature of the tutorial and study improvement groups' climate. In retrospect, it does seem plausible to consider the tutorial or study improvement programs, both of which were conducted on an individualized or very small group basis, to have imparted to the student a vote of confidence in his ability to master the task through his own efforts. The student was also provided with some of the means for achieving success predicated on the basic assumption that he possesses the necessary ability to succeed. When the new skills are combined with the proper emotional climate, the participant may indeed develop an enhanced expectancy of being more in control. On the other hand, the computer approach, being conducted in an impersonal manner, may not so effectively have conveyed this message; although there was always immediate and direct reinforcement of each response, the student could still have rationalized his failures by blaming the "machine" or the "program". When, in fact, there were also occasional equipment or program failures, there may even have been some inadvertent reinforcement of the external expectancy approach.

None of the experimental interventive procedures yielded significant group changes in the grades obtained by the participants. One might speculate first of all as to whether it was not an overoptimistic act of faith to have expected any kind of brief intervention to produce

an immediate effect on grades. Perhaps experimentally-induced effects, if they occur at all, would take a much longer period of time to be manifested. Also, it could be that a much more prolonged and intensive intervention would be required to modify grades which seem to be one of the most resistant symptoms for change.

One should also consider teacher attitudes in the analysis of the finding that none of the interventive procedures yielded a significant change in grades. It soon became quite evident that some of the teachers resented their students', especially those in the computer group where this was often the case, missing valuable class time. Some indicated that they would make no special allowance for the fact that the student missed certain class work, including examinations. Others may have perceived the intervention as a personal threat, construing the special effort as an indication that they had not done as well with the student as some other approach might. In any case, some of these conscious or unconscious attitudes could very well have indirectly influenced the grades assigned on tests, particularly those in which more subjective scoring was possible.

A less subtle effect may have been based on the fact that the Ss in the computer group actually did have to absent themselves from their regular classroom to travel to, and participate in, the computer training. Although every effort had been made to minimize the amount of loss of classroom instruction for any one student, some of the students did have to miss a block of time. They were, therefore, penalized in having less opportunity to learn the subject matter in which they were subsequently graded. Perhaps one could consider their acquitting themselves as well as they did on post-treatment grades, despite this handicap, as an indication that the computer training in internality actually did not produce such a poor result on grades.

Finally, this discussion would be incomplete without reference to an exceedingly important limitation of the results. Extreme caution should be exercised in generalizing from these results since the tutorial and study skill improvement interventive procedures were conducted by only a total of three individuals. The degree to which the procedures' effectiveness, both in terms of change in internal-external expectancy and grades, is a function of the specific personnel used, needs to be assessed. Similarly, the limited effectiveness of the computer approach, as determined in the present study, applies to the specific time spent on the program, the specific schedule of reinforcement employed, and other specific aspects of the total situation used. It should also be emphasized that in the second phase of the study only an extreme population, i.e., high external underachievers, were used on the assumption that if this exploratory study could demonstrate I-E and academic performance change in

extreme underachievers, it would be possible later to investigate I-E modifications, as well as associated improved academic performance, in less extreme populations. Moreover, since it was not intended originally to extend this study to all aspects and dimensions of the problem of underachievement, the work applies only to underachievers who have at least average intelligence.

Recommendations

It is recommended that the methods described in the present study be replicated with a larger number of subjects, with more diverse personnel (teachers and tutors), and with different computer systems.

As for practical educational applications, although it has not been demonstrated that a change from a more external to a more internal attitude is accompanied by improved grades, the finding that underachieving seniors are significantly more external than normally achieving seniors suggests that teachers should attempt in every way possible to avoid the development in children of an attitude of despair and disengagement which this external expectancy implies. It is as important for children who do not achieve at their ability level to retain a sense of personal involvement and desire for improvement through personal effort as it is for children who succeed academically. Moreover, the present findings suggest that one class of expectancies, namely, that of internal versus external expectancy, can be modified in the direction of greater internality by means of a planned program which involves an interpersonal relationship in which both cognitive functions and a general approach to solving problems is emphasized.

References

Clark, W. W., & Tiegs, E. W. Examiner's manual, California short-form test of mental maturity. Monterey, Calif.: California Test Bureau, 1963.

Crandall, V. C., & McGhee, P. E. Expectancy of reinforcement and academic competence. Journal of Personality, 1968, 36, 635-648.

Farquhar, W. W., & Payne, D. A. A classification and comparison of techniques used in selecting under- and over-achievers. Personnel and Guidance Journal, 1964, 42, 874-884.

Franklin, R. D. Youth's expectancies about internal versus external control of reinforcement related to N variables. Unpublished doctoral dissertation. The Ohio State University, 1962.

Goldstein, B. Low income youth in urban areas: A critical review of the literature. New York: Holt, Rinehart, & Winston, 1967.

Gowan, J. C. Underachievement revisited. High School Journal, 1964, 48, 117-119.

Peterson, J. The researcher and the underachiever: Never the twain shall meet. Phi Delta Kappan, 1963, 44, 379-381.

Preston, R. C., & Botel, M. How to study. Chicago: Science Research Associates, 1956.

Rotter, J. B. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 1966, 80 (1, Whole No. 609).

Science Research Associates. National Educational Development Tests Manual. Chicago: SRA, 1965.

Tolor, A. Incidence of underachievement at the high school level. The Journal of Educational Research. In press.

Appendix

Armstrong, W. H. *Study is hard work*. New York: Harper & Brothers, 1956.

Detjen, M. F. & Detjen, E. W. *Your high school days*. New York: McGraw-Hill Book Co., Inc., 1958.

Holt, J. *How children fail*. New York: Dell Publishing Company, Inc., 1964.

Lass, A. H. *How to prepare for college*. New York: David White Co., 1962.

McCullar, B. *How to study and why*. New York: American Recording Society.

Orchard, N. E. *Study successfully: eighteen keys to better work*. New York: McGraw-Hill Book Co., Inc., 1953.

Reilly, W. J. *Career planning for high school students*. New York: Harper & Brothers, 1953.

Willis, E. *Questions freshmen ask*. New York: Dutton, Co., Inc., 1962.

I-E Scale

Name_____ Date_____
(Last) (First)

In each case circle (a) or (b) whichever you more strongly believe to be the case. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief. Obviously there are no right or wrong answers. Be sure to find an answer for every choice. In some instances you may discover that you believe both statements or neither one. In such cases, select the one you more strongly believe to be the case as far as you're concerned. Also, try to respond to each item independently; do not be influenced by your previous choices.

1. (a) Children get into trouble because their parents punish them too much.

   (b) The trouble with most children nowadays is that their parents are too easy with them.

2. (a) Many of the unhappy things in people's lives are partly due to bad luck.

   (b) People's misfortunes result from the mistakes they make.

3. (a) One of the major reasons why we have wars is because people don't take enough interest in politics.

   (b) There will always be wars, no matter how hard people try to prevent them.

4. (a) In the long run people get the respect they deserve in this world.

   (b) Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. (a) The idea that teachers are unfair to students is nonsense.

   (b) Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. (a) Without the right breaks one cannot be an effective leader.

   (b) Capable people who fail to become leaders have not taken advantage of their opportunities.

7. (a) No matter how hard you try some people just don't like you.

   (b) People who can't get others to like them don't understand how to get along with others.

8. (a) Heredity plays the major role in determining one's personality.

   (b) It is one's experiences in life which determine what they're like.

9. (a) I have often found that what is going to happen will happen.

   (b) Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. (a) In the case of the well prepared student there is rarely if ever such a thing as an unfair test.

    (b) Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. (a) Becoming a success is a matter of hard work, luck has little or nothing to do with it.

    (b) Getting a good job depends mainly on being in the right place at the right time.

12. (a) The average citizen can have an influence in government decisions.

    (b) This world is run by the few people in power, and there is not much the little guy can do about it.

13. (a) When I make plans, I am almost certain that I can make them work.

    (b) It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. (a) There are certain people who are just no good.

    (b) There is some good in everybody.

15. (a) In my case getting what I want has little or nothing to do with luck.

    (b) Many times we might just as well decide what to do by flipping a coin.

16. (a) Who gets to be the boss often depends on who was lucky enough to be in the right place first.

    (b) Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.

17. (a) As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

    (b) By taking an active part in political and social affairs the people can control world events.

18. (a) Most people don't realize the extent to which their lives are controlled by accidental happenings.

    (b) There really is no such thing as "luck."

19. (a) One should always be willing to admit mistakes.

    (b) It is usually best to cover up one's mistakes.

20. (a) It is hard to know whether or not a person really likes you.

    (b) How many friends you have depends upon how nice a person you are.

21. (a) In the long run the bad things that happen to us are balanced by the good ones.

    (b) Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. (a) With enough effort we can wipe out political corruption.

    (b) It is difficult for people to have much control over the things politicians do in office.

23. (a) Sometimes I can't understand how teachers arrive at the grades they give.

    (b) There is a direct connection between how hard I study and the grades I get.

24. (a) A good leader expects people to decide for themselves what they should do.

    (b) A good leader makes it clear to everybody what their jobs are.

25. (a) Many times I feel that I have little influence over the things that happen to me.

    (b) It is impossible for me to believe that chance or luck plays an important role in my life.

26. (a) People are lonely because they don't try to be friendly.

    (b) There's not much use in trying too hard to please people; if they like you, they like you.

27. (a) There is too much emphasis on athletics in high school.

    (b) Team sports are an excellent way to build character.

28. (a) What happens to me is my own doing.

    (b) Sometimes I feel that I don't have enough control over the direction my life is taking.

29. (a) Most of the time I can't understand why politicians behave the way they do.

    (b) In the long run the people are responsible for bad government on a national as well as on a local level.